Sydney L Wright

APRIL, 1908.

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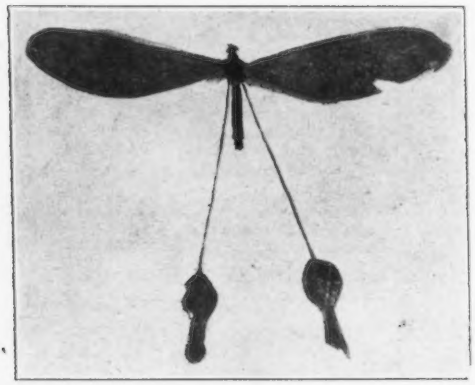

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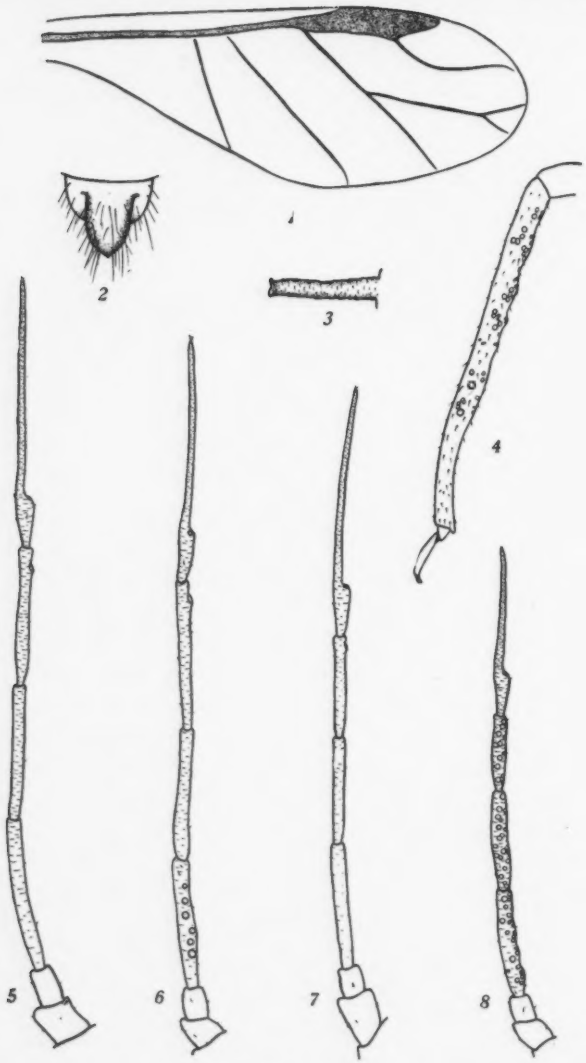

APHIS FOLSOMII (DAVIS).

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XIX. APRIL, 1908. NO. 4.

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A New Aphid on the Virginia Creeper.

(APHIS FOLSOMII n. sp.)

BY JOHN J. DAVIS, Urbana, Ill.

(Plate VII.)

Last spring (1907) I noticed numbers of this plant louse on the vines of the Virginia creeper, *Parthenocissa* (*Ampelopsis*) *quinquefolia,* which were growing in an old greenhouse. The old frames of the greenhouse were much warped, leaving large openings through which the vines gained access to the room. Here the lice made their appearance and were most abundant, though later in the summer they were not uncommon on the same vines outside of the building. I have examined the Virginia creeper at other places, both in Urbana and in other Illinois localities, but nowhere else have I been able to find this species.

My first observations were made May 2, 1907, at which time only a few individuals were to be found and they occurred singly upon the young shoots. These aphids were

nearly adult and were probably the stem mothers. During the earlier part of the year it required twelve to fourteen days for them to become mature, but later in the warmer summer months the period for maturity was much shorter. The number of young per female was, in two instances, 106 and 109, respectively. The length of time required to give birth to these young were 15 and 21 days respectively, or an average of 7 plus in the first case and 5 plus young per day in the second.

The lice were evidently partial to the young tender shoots, but later in the summer when these became crowded, some of the aphids were obliged to secure their food supply from the leaf petioles or the undersides of the leaves.

The first adult winged form was noticed May 21st, it having been born May 9th or 10th. The lice continued to increase in numbers until about the middle of July, but from then until about August 12th, only occasional specimens were found, the others having become winged and having probably migrated to other places. They began to be more numerous, however, August 12th, and by August 19th were comparatively abundant, most of them being immature individuals. This second appearance of the aphids in numbers was not due to return migrants, but rather to the progeny produced by the few wingless forms that had remained. I was unable to follow up the appearance of the bisexual generation, but when examinations of the vines were made the first part of October, wingless oviparous females and winged males were found *in copula,* and also a few eggs deposited upon various parts of the vine. Later in the fall but occasional eggs could be found upon the vines and I concluded that the ant (*Cremastogaster lineolata*) had carried them to its nest. From the very first appearance of the aphids and throughout the summer this ant had been in constant attendance upon them. The lice secreted, from the anus, a somewhat milky fluid which soon became more or less solidified. Upon the parts of the plant occupied by the lice many of these globules were usually found.

Aphis folsomii n. sp.

Wingless viviparous female.—Body very dark brown, head paler. Antennæ dark brown to black, excepting the fourth and fifth segments, which are white; not reaching the cornicles. Eyes black. Beak pale, excepting the bases of the femora and the distal ends of the tibiæ. Fore legs light brown, excepting at the joints and the tarsi. Middle pair of legs as in fore pair, except that the darkened area is greater. There are about five indistinct spots or pits, darker than the body color, dorsally and on each side of the abdomen. Cornicles black, cylindrical, imbricate, slightly dilated apically, and two and a half to three times the length of the tarsi. Style black, conical and about one-half the cornicles in length.

Measurements.—Length of body, 2.0-2.254 mm.; width, 1.40-1.781 mm.; antenna, I, 0.081; II, 0.049; III, 0.212; IV, 0.146; V, 0.195; VI, basal, 0.114; filament, 0.228; total, 1.025 mm. (Measurements from live specimens.)

Winged viviparous female.—Head and thorax black, abdomen dark brown. Antennæ concolorous with the abdomen, not reaching to the cornicles, imbricated; with four to seven circular sensoria on segment III and, as usual, one at the distal end of V, and several at the apex of the thickened basal portion of VI. Eyes black. Wings hyaline, with conspicuous black veins, the first and second discoidals branching at a point about two-thirds the distance from where they leave the third discoidal to the margin. Legs dark with small paler areas at the middle of the tibiæ and femora. Cornicles black, cylindrical, imbricated, slightly dilated apically, and twice the length of tarsi. Style dark, conical, and one-half as long as the cornicles.

Measurements.—Length of body, 1.62-2.036 mm.; width, 0.81-0.98 mm.; length of wing, 2.21-2.62 mm.; antenna, I, 0.0652; II, 0.0733; III, 0.2727; IV, 0.2454; V, 0.2545; VI, basal, 0.1031; filament, 0.3999; total, 1.4141 mm.; cornicles, 0.218-0.255 mm.; style, 0.122 mm.; hind tarsus, 0.126 mm. (Measurements from live specimens.)

Pupa.—Abdomen with no white flocculent spots. Legs (excepting tarsi), antennae (excepting tips), and cornicles white, to the naked eye. Style with a slight whitish bloom.

Wingless oviparous female.—Abdomen reddish brown, thorax darker, and head paler. Antennae dark, excepting segments III, IV, and V, which are white, imbricate, and not reaching to the cornicles. Eyes black. Beak reaching to hind coxæ. Abdomen with a row of very minute black dots on each side. Tarsi and articulations of the fore pair of legs dark to black, remainder pale brownish; middle pair with darkened area larger; hind legs almost entirely dark brown to black, the hind tibiæ swollen and with numbers of sensoria along the inner side. Cornicles concolorous with abdomen, cylindrical, imbricate, and slightly longer than the body color, conical, equal to or slightly less than the hind tarsi in length.

Measurements.—Length of body, 1.5273-2.1816 mm.; width, 1.0908-1.2816 mm.; antenna, I, 0.0801; II, 0.0611; III, 0.2635; IV, 0.2159; V, 0.1969; VI, basal, 0.0896; filament, 0.3273; total 1.2444 mm.; cornicles, 0.1738 mm.; hind tarsus, 0.1344 mm.; style, 0.1141 mm. (The above measurements are averages from specimens mounted in balsam.)

Egg.—The black shining egg is elliptical and measures 0.7009 by 0.3260 mm.

Winged male.—Head and thorax black, abdomen dark reddish brown. Antennæ black, imbricated, with numerous circular sensoria irregularly placed on segments III, IV, and V. There are usually twenty or thirty sensoria on III and IV, and half that number on V, but these numbers sometimes vary although the proportions are generally the same. Eyes black. Wings hyaline, with black veins, the first and second discoidals branching at a point about two-thirds the distance from where they leave the third discoidal to the margin. Legs dark to black, excepting the middle portions of the tibiæ and femora. Cornicles very dark, almost black, cylindrical, imbricated, slightly less than the hind tarsi in length. Style dark but not black, conical, and longer than the tarsus.

Measurements.—Length of body, 1.1999 mm.; width, 0.5636 mm.; length of wing, 1.7452 mm.; antenna, I, 0.0591; II, 0.0529; III, 0.2180; IV, 0.1895; V, 0.1650; VI, basal, 0.0825; filament, 0.2872; total, 1.0542 mm.; cornicles, 0.0978 mm.; hind tarsus, 0.1141 mm. (Measurements from specimens in alcohol and in balsam.)

Mr. T. A. Williams, in a bulletin of the Department of Entomology, University of Nebraska, listed a new species, *Aphis parthenocissi* on *Parthenocissa quinquefolia,* but did not describe the same.

This species is closely allied to *Aphis ilicis* Kalt.—(*A. hederae* Kalt.) of Europe, but compared with the European descriptions is quite distinct.

I respectfully dedicate this species to Doctor Justus W. Folsom, who by the publication of "Entomology with reference to its Biological and Economic Aspects" has done so much for the advancement of entomology, and to whom the writer is indebted for many helpful suggestions.

EXPLANATION OF PLATE VII.

Aphis folsomii.—1, wing of viviparous female; 2, style of winged viviparous female; 3, cornicle of winged viviparous female; 4, hind tibia of oviparous female, showing sensoria; 5, antenna, of wingless viviparous female; 6, of winged viviparous female; 7, of wingless oviparous female; 8, of winged male.

Color and Environment.

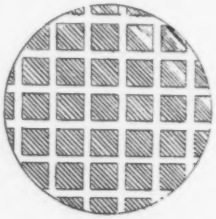
By Howard Austen Snyder, Philadelphia, Pa.

While collecting insects in the Bermuda Islands in the year 1905, I perceived that the common wasps I saw flying were of a lighter shade than those of the United States, and expected to find in my net a species different from our own, but on examination I saw that they were identical with our *Polistes pallipes*. The difference in shade I attribute to the fact that as Bermuda has coral roads and white calcimined roofs, the average shade of the country has had the effect of producing a lighter shade in its insects. As every one knows, the more contrasted in color or shade an insect or bird is with relation to surrounding objects, or the background on which it rests, the more liable it is to be discovered and devoured or killed by its enemies. Locally we see that effect in the locust, *Trimerotropis maritima,* and the tiger beetle, *Cicindela dorsalis,* of our own coasts, which from their habit of frequenting the light sandy tracts, have had their darker ancestors eliminated by this fact in the economy of nature, and only the light ones remain and are inconspicuous and less liable to destruction. Their color serves to keep them on the sand, for let them wander inland where there is vegetation and a darker soil, and they are soon discovered and destroyed. With bees and swift flying creatures this rule cannot so well apply, as they are never long in one place, and can elude their enemies. The tiger beetle and locust alight frequently and are more often resting in sight of enemies.

I mean to indicate by the above that in any country, especially an isolated one, the insects will average darker or lighter according to the shade of the land and vegetation. Let a dark insect inhabit a country where the roads and the roofs are white, it will be rendered conspicuous and thus exposed to danger oftener than it would be in a country where the surface is darker. The diagram below will portray in a general way the appearance of Bermuda as compared with that of the United States—not exactly, of course. For the proper

effect, the diagram should be viewed at a distance of ten feet, when the difference in degree will be seen without detail.

United States.



Bermuda.

The average road in the United States is about the color of a plowed field, and hence of little effect in modifying the general shade. In Bermuda the roads are closer than in Pennsylvania, and hence effective in lightening the general aspect of the country—and added to this, the roofs increase the effect, and although an insect in its flight might many times fly over or alight on a dark background, among the thousands of objects visible, of two insects of one species, the slightly darker one will be the first discovered on a light background; the lighter ones will live the longer and naturally have more descendants.

It seems unnecessary since acquaintance with Darwin's theory is so wide-spread, to say that although all animals resemble their parents, they all vary in minor particulars, and any difference in color or otherwise may serve to protect one and enable it to live long enough to produce its kind with a like resemblance and a little immunity. Nature seizes upon that which is good.

It may be asked why these insects are not still lighter, but here the law of equilibrium intervenes and prevents a further advance. There is danger when it becomes too light of becoming too conspicuous. Taking an extreme case, a white insect would be at once a prey of its enemies when on or over the darker vegetation. They are held back far enough from white to be fairly safe on a dark background.

This theory cannot be tested in a large country, where the shades and colors are various, and can only partially be proven in an isolated country. The Bermudian surface affords us the best possible exemplification of the theory.

As material for reasoning in this line, let us imagine a coral island placed seven hundred miles from the mainland, as Bermuda is, but connected with it by a chain of islands, as Bermuda could have been, and let all the intervening islands become submerged by the subsidence of the sea bottom, which is possible. Up to this time, the insects of the mainland have had free access to all the islands, and vice versa. Consequently, the species are similar and the above condition among the insects of the island cannot arise, but now that they are cut off from the mainland, the local environment begins to shape their destiny, which seems to be as described.

I believe that all insects so placed will have their colors modified unless extremely well defended by poisonous qualities, weapons of defense or underground habits.

A New Variety of Papilio Philenor.

By Henry Skinner.

Papilio philenor hirsuta n. var.

This differs from the ordinary form in the hairy character of the body and the shortness of the tails. The thorax and abdomen are clothed with long black hairs and the tails are 4.5 mm long. Male and female from Plumas County, California, 9,500 feet elevation. Received from Mr. George Franck.

Editors, Ent. News:—I take pleasure in announcing the recent organization of "The Association of County Entomologists" of California, formed in San José, February 15th, 1908. W. H. Volck, Entomologist for Santa Cruz and Monterey Counties, was made president, and E. L. Morris, Entomologist for Santa Clara County, secretary and treasurer.

The object of the Association is for a more perfect co-operation in dealing with problems common to the orchardists of the districts represented. We hope by frequent consultations, comparison of plans and results of work to be better able to further the horticultural interests in our counties.—Earl L. Morris, *Secretary.*

Pitcher-Plant Insects.—III.

By Frank Morton Jones, Wilmington, Delaware.

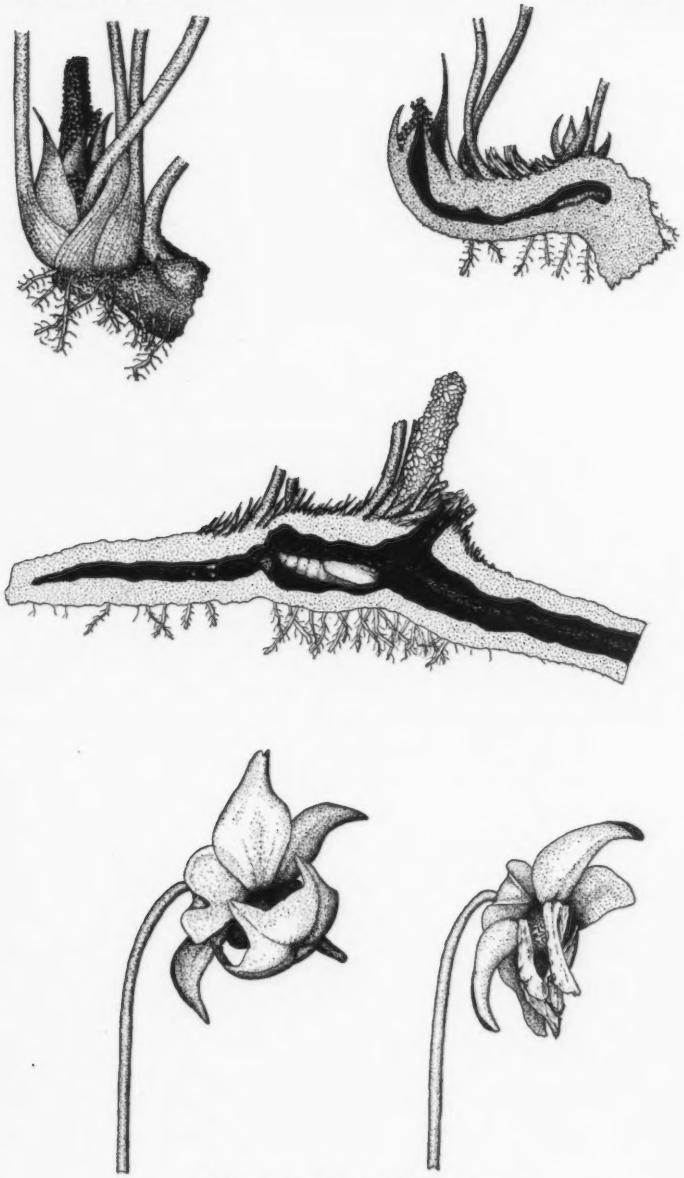
(Plates VII-IX.)

Papaipema appassionata Harvey.

Of the insects observed at Summerville, South Carolina, making *Sarracenia* their food-plant, next in abundance to the Exyras was a root-borer which proved to be *Papaipema appasionata* Harvey. The burning over of the meadows makes the work of this insect in the roots of *Sarracenia flava* much more apparent than in those places where the tangled clumps of leaves of the preceding season conceal the ground. On these comparatively bare portions of the Sarracenia meadows, and especially in the less swampy places, it becomes apparent early in April that a very large proportion of the roots of *Sarracenia flava* contain this larva, which bores, first perpendicularly through the buds, then horizontally, following the course of the root-stock and keeping open the passage to the surface for the disposal of the frass, which is built up into a closed turret-like tube, capping the entrance to the burrow.

So numerous are these burrows that whole clumps of *flava* with their interlaced root-stocks fail for a time to put up either buds or leaves, and many which start to grow are undermined and killed by the operations of the borer. The much larger frass-tubes formed in the preceding year by full grown larvæ are also noticeable among the roots, showing that these structures are compact and tough enough to last through a winter's exposure to the weather. Their purpose is probably to prevent the burrows from being flooded during rains and temporary inundations. At first only a fraction of an inch in height, these turrets are extended with the growth of the larvæ to a height of two inches or more, and are often built against and partly supported by one of the larger fleshy leaf-stems, through which the burrow extends into the root-stock.

The upper figures on Plate VIII, show the condition of the turrets, the extent of feeding, and the position of the larvæ in the root-stocks on April first. Throughout the sum-



PITCHER-PLANT INSECTS (JONES).

mer these larvæ extend their burrows through the root-stocks, throwing up new turrets from time to time as they follow the winding course of the interlaced roots. Pupation takes place in a wide part of the burrow, not far from the surface, provision having previously been made for the escape of the moth (middle figure, Plate VIII). The first pupa was noted September twenty-second, though some not observed were evidently a few days earlier; the moths commenced to emerge October sixteenth, the last emergence of eighteen being November third.

The unusually long larval period is presumably the effect of the long season in this southern locality, the insect being single-brooded here as in the north.

Mr. Henry Bird has described this larva from specimens found in *Sarracenia purpurea* in New Jersey (see Can. Ent. xxxv, 91-94), in which plant they did not pupate in the burrows, nor was the turret-building habit observed. Mr. Bird has kindly compared the South Carolina specimens from *flava* with his New Jersey specimens from *purpurea,* and finds them identical, the examples bred from *flava,* as would be expected, being slightly larger.

Olethreutes daeckeana Kearfott.

The larva of *Exyra rolandiana* has been noted as feeding in the flowers and unripe ovaries of *Sarracenia purpurea.* At Summerville no *Exyra* larvæ were found in the flowers of either *Sarracenia flava* or *Sarracenia minor.* The flowers of *minor,* however, which begin to appear toward the end of April, are frequently destroyed by a small Tortrix caterpillar, which feeds among the petals and stamens and also burrows into and hollows out the green ovary, fastening the debris of the flower together with silk. In these larva-infested flowers the umbrella-shaped style withers and the shrivelled petals cling to the wreck of the flower instead of falling at the usual time. The lower figures on Plate VIII illustrate a healthy flower after the fall of the petals and an infested one.

These larvæ were noted about May first, when a few of

them were almost full fed; they became more abundant by the middle of the month. A slight cocoon is formed in the flower from the debris loosely held together with silk, and from this the brown pupa pushes its way out some hours before the emergence of the moth. Of those under observation, the first appeared May twenty-third, though at that date many of the later larvæ had not pupated. The latest emergence noted was June thirteenth.

From unripe ovaries of *Sarracenia purpurea* gathered near Katahdin Iron Works, Maine, later in the season (August), the same insect was bred, and Mr. Kearfott identifies it as *Olethreutes daeckeana,* a species which he described in 1907 from a New Jersey locality where its food-plant was also *Sarracenia purpurea,* so it is evidently widely distributed and will probably be found wherever *Sarracenia* is abundant.

Archips parallela Rob.

Toward the end of May still another insect may be found attacking *Sarracenia minor;* this is the larva of a Tortricid,—a smooth, cylindrical caterpillar about seven-eighths of an inch in length, dull dark sage-green in color, studded with small white tubercles bearing short fine white hairs; the head and thoracic shield are yellowish-brown with black markings, and the feet black.

This caterpillar seems to prefer the smaller open leaves of *Sarracenia minor.* It fills the upper portion of the tube with a white opaque web, through which it retreats in a tortuous passage when alarmed. In feeding it takes no care not to eat entirely through the leaf-wall, and the upper portion of the hood usually shows a ragged hole where the caterpillar has fed. A number of these larvæ of different ages were found in localities widely separated, so their occurrence in this food-plant was evidently not accidental. Of these, one fell a victim to the new leaf to which it was transferred,—evidence that this insect has not yet perfectly adapted itself to this dangerous food-plant. One larva on June third left the leaf in which it had been feeding, ensconced itself on the

outside of another leaf of *minor* in the angle formed by the flat wing of the leaf and the outside of the tube, and here spun a tubular shelter by bridging this corner with a web of opaque white silk; here, a few days later, it changed to a brown pupa, which on June twenty-second forced its way out of the cocoon by means of the double row of spines with which its segments are armed, and the moth emerged. Mr. W. D. Kearfott pronounces the moth to be a typical specimen of *Archips parallela* Rob., a widely distributed species with a long list of recorded food-plants. On some of its other food-plants this caterpillar spins several leaves together to form a more or less tubular shelter. It would be interesting to determine to what extent it is adapting itself to the other species of *Sarracenia* found within its range.

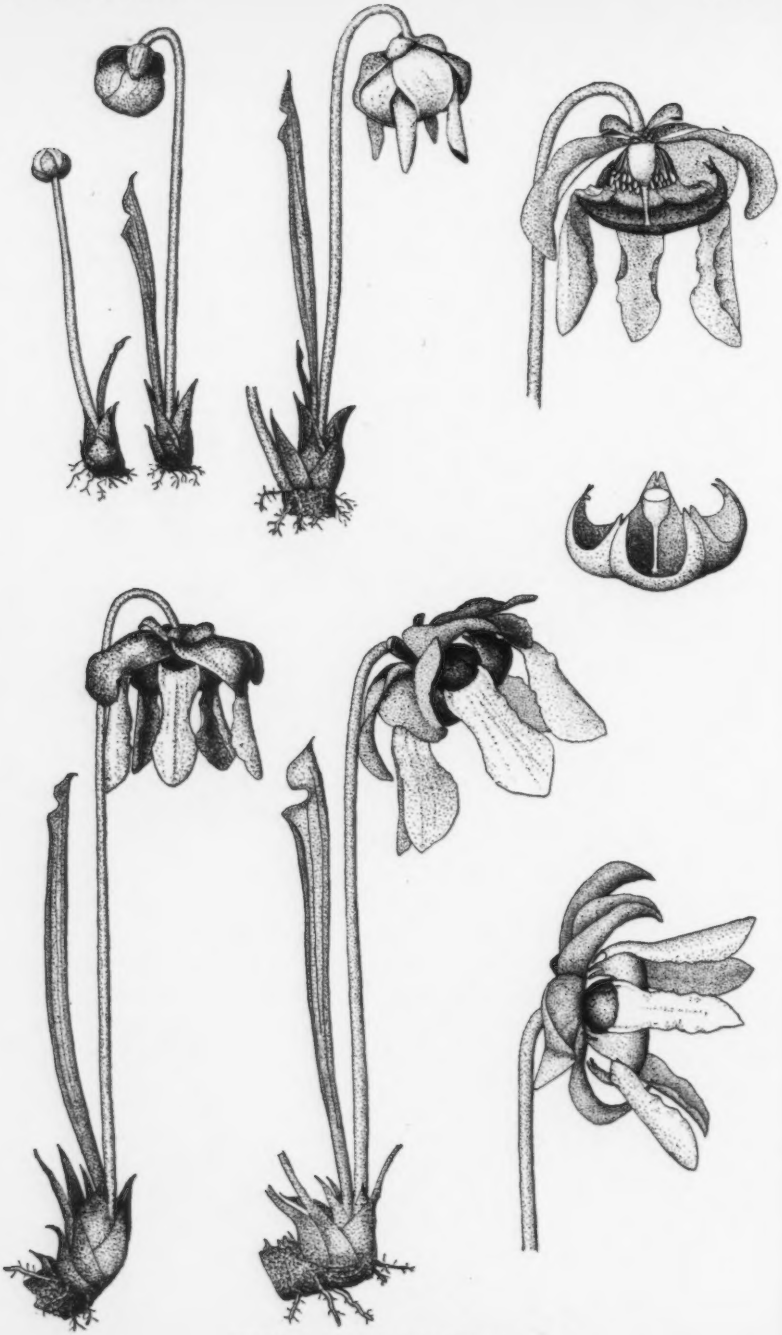
POLLINATION.

That *Sarracenia* must depend upon insect agency to effect pollination of the blossom was recognized long ago by the botanists, and the structure of the flower indicates something of the method by which this must be accomplished. Careful observation of the insect visitors of *Sarracenia flava* throughout its blooming season make it seem probable that in this species the method of pollination differs in some respects from the published accounts of this process in the genus *Sarracenia* in general. In *flava,* as in the other species of the genus, the style is a curious umbrella-shaped structure, each of its five points being cleft, and the stigmatic surfaces are situated on little projecting points at the base of these clefts on the concave side of the open umbrella. The petals at the base form a close bell-shaped cover, spreading out and filling the space between the points of the inverted umbrella; and access to the nectar and pollen is possible only at one of five openings, situated just below the curled-up tips of the umbrella with their projecting stigmatic points.

An insect alighting on a petal enters the flower, turns at right angles in either direction to one of these openings, and in forcing its way through, if of suitable size, scrapes its back

across the projecting point of the stigma. In *flava* especially, egress is exceedingly difficult except at the five entrance holes; and all of the numerous insects observed visiting these flowers emerged after considerable struggling through one of these orifices, almost invariably again scraping the stigma in their departure. In *flava* therefore, with its heavy closely-overlapped petals usually preventing the escape of the visiting insects except by repassing the stigma, some special provision for preventing habitual self-pollination by insect agency would be expected; and this seems to be provided for in the position the flower assumes upon its stem at various ages. When the bud first appears above the ground it is borne upright upon the stem; as the blooming period draws near, the stem bends just below the bud, making a complete turn, so that when the flower opens the style occupies the position of an inverted umbrella, catching and retaining the falling pollen, most of which is shed within twenty-four hours after the flower begins to open. The flower then begins again to change its position, often being very noticeably tilted on the stem by the third day, and eventually, long before the fall of the petals, it takes a position at right angles to the original one. These changes of position and the structure of the flower are shown on Plate IX. The tilted and finally upright flowers naturally retain less pollen than the newly opened horizontal ones, and often the tilted flowers show little trace remaining of the abundant supply in the newly-opened blooms. As the blossoms remain fresh and continue to be attractive to insects for more than two weeks, it would seem that this change in the position of the flower and the consequent spilling of the pollen decidedly favor cross-fertilization.

Ants are almost invariably present in the flowers, attracted by the abundant nectar oozing from the ovary, but they are probably of little importance as pollenizers. The ant most abundant in *flava* at Summerville is identified by Prof. W. M. Wheeler as *Tapinoma pruinosa* Roger. Ants, wasps, and occasionally butterflies visit the outside of the flower; spiders,



PITCHER-PLANT INSECTS (JONES).

small beetles, and even the little green tree frogs which habitually occupy the leaves, are sometimes found ensconced in the flowers; but from the first opening of the *flava* blossoms in March, their most frequent visitor on sunny days is the honey-bee, which being of suitable size to snugly fit the orifice, rarely enters or leaves without brushing the stigma. Most of these bees carry loads of pollen, and do not seem to exercise any choice, relative to the age of the flowers, in making their visits. Much smaller bees, *Augochlora* and *Osmia*, are less frequent visitors and on account of their size usually escape contact with the stigma. At rare intervals a bumble-bee may be seen forcing its way into the flower by the usual path, but this insect proved so infrequent a visitor that it can scarcely be considered of much importance as a pollenizer of *flava*.

One other insect, however, of suitable size to effect pollination, an insect always associated with *Sarracenia*, is a constant visitor to the blossoms. The Sarracenia fly, *Sarcophaga sarraceniae* Riley, habitually resorts to the blossoms as well as to the leaves, perhaps more for shelter than for food. At night and on cool, windy or rainy days these flies crowd into the blossoms, sometimes to the number of three or four to one flower; they are rough, bristly, and often yellow with pollen; they enter and leave the flowers by the only practicable path, the orifice just under the stigma, which they are of suitable size almost necessarily to touch in passing.

It has been suggested that the pitcher plant moths (*Exyra*) may be pollenizers of these flowers; but as *flava* at Summerville commences to bloom in March, and *Exyra ridingsii*, the species most intimately associated with it, does not appear until the middle of May, and *Exyra semicrocea* not until the middle of April, this can scarcely be the case. The color of the flowers and the fact that their fragrance becomes more noticeable toward evening indicates the possibility that night-flying insects may aid in pollination. The following list includes all the day-time visitors found in sufficient numbers to indicate that they are habitual visitors to these flowers:

In *Sarracenia flava*:

Coleoptera:

Chauliognathus marginatus Fabr.

Diptera:

Sarcophaga sarraceniae Riley.

Hymenoptera:

Apis mellifera L.
Bombus Pennsylvanicus De G.
Augochlora (*confusa* Robt.?).
Osmia sp.
Halictus sp.
Tapinoma pruinosa Roger.

The small brilliantly-metallic bees, *Augochlora*, and an *Osmia*, were also noted frequenting the blossoms of *Sarracenia minor*, which did not seem to be visited by the larger insects. Dr. Mellichamp has recorded a beetle, *Euphoria melancholica*, as an occasional visitor to this flower. The size and structure of the flower, however, seem to indicate the small bees as the more suitable pollenizers.

A New Genus and Species of Decticinae (Orthoptera) from California.

By Morgan Hebard.

Cyrtophyllicus* new genus.

This genus is related to *Zacycloptera* Caudell† from which it differs chiefly in the very minute wings, the different form of the cerci and tegmina and the more spinose legs.

Male only known. Fastigium blunt and not half as broad as basal joint of antennæ. Pronotum slightly produced caudad, dorsal surface almost flat; lateral carinæ not distinct cephalad but developed as distinct shoulders caudad, diverging regularly caudad and at the caudal margin separated by slightly more than twice the width at the median portion of the prozona. Prosternum armed with a pair of long slender

**Cyrtophyllus* genus of *Pseudophyllinae*, εἰκὸς, that which resembles.

†Proceedings U. S. Nat. Mus., Vol. XXXII, p. 308.

spines. Mesosternum armed with a similar pair of spines. Tegmina short, not reaching the apex of the abdomen, rounded and inflated. Wings very minute. Supra-anal plate small and obscure, the last dorsal abdominal segment produced, deeply and rounded emarginate, bounded laterad by rounded

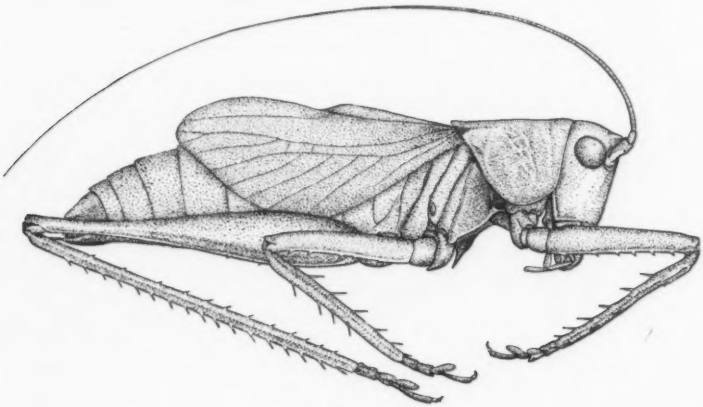


FIG. 1.

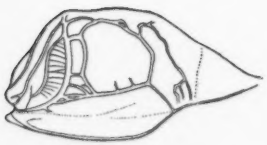


FIG. 2.

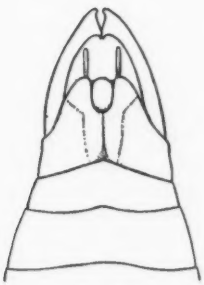


FIG. 3.

Figure 1. *Cyrtophyllicus chlorum* n. gen. and sp. Lateral view of type. (x 3.)

Figure 2. *Cyrtophyllicus chlorum* n. gen. and sp. Tympanum of male. (x 3.)

Figure 3. *Cyrtophyllicus chlorum* n. gen. and sp. Dorsal view of apex of male abdomen. (x 6.)

lobes. Cercus slender, somewhat bowed and armed with a single heavy tooth. Legs moderately long, slender and well spined.

Type.—*Cyrtophyllicus chlorum,* new species.

Cyrtophyllicus chlorum new species.

Type.—Male; El Portal, Mariposa County, California. Altitude, 3,200 feet. August 30, 1907. Collected by Morgan Hebard. (Hebard collection.)

Size moderate; form somewhat slender. Head not broader than cephalic portion of pronotum into which it is well inserted; fastigium of vertex short, blunt, compressed and deeply sulcate; eyes small, prominent and semiglobose; antennæ in length almost six times that of pronotum, filiform, width of basal segment two-thirds that of eye, antennal scrobes somewhat protuberant. Prozona of pronotum not punctate, metazona rugoso-punctate, separated from the prozona by a distinct straight transverse sulcus; median carina of pronotum scarcely visible; prozona twice the length of metazona; cephalic margin perceptibly concave, caudal margin broadly rounded. Tegmina slightly more than twice as long as the pronotum, broad and considerably swollen, apically rounded, the costal field much enlarged, costal margin arcuate; tympanal area distinctly wider than the caudal width of the pronotal disk, its length exceeding width by a third of the latter. Wings minute falciform lobes. Abdomen moderately plump, rounded, without dorsal carina, the terminal dorsal abdominal segment covered with very fine hairs. Cerci more than five times as long as the basal width, covered with very fine hairs and on the inner side near the tip armed with a heavy, short and sharp pointed tooth. Subgenital plate with a very shallow subtrigonal apical emargination, styles long and filiform. Legs moderately long and slender, covered with short fine hairs; posterior femora two and one-half times as long as pronotum and very little swollen on the basal half, armed below on both margins on the apical half only with eleven to twelve small sharp spines; anterior and median femora of equal length, longer than the pronotum by a quarter of its length, both armed below on both margins with small spines numbering six to eight on the margins of the anterior femora and seven to eleven on those of the median femora. Posterior tibiæ slightly compressed, armed below with two apical spurs, margins well spined; anterior and median tibiæ armed below with six pairs of heavy spines, anterior tibiæ with four spines in the dorso-caudal margin.

General color uniform bright grass green; eyes pale nut brown; antennæ straw color.

MEASUREMENTS.

Length of body	26.2 mm.
Length of pronotum	6.1 mm.
Greatest caudal width of pronotal disk	5. mm.
Length of tegmen	14.5 mm.
Width of tympanum	6.5 mm.
Length of caudal femur	17.2 mm.

The single specimen taken was collected at night with the aid of a lantern, stridulating loudly on a low green bush. Even when approached it did not cease its stridulation, but kept up a loud and constant zick, zick, zick, zick,.....much like our eastern *Scudderia* but far louder. Other individuals were heard stridulating loudly during the night until just before dawn.

In endeavoring to capture other specimens during the evening one was located in a high oak tree, another about twelve feet from the ground in a dense bush, another in a tangle of vines near the ground and others, including the specimen captured, in low green bushes on the mountain side. All collecting was done after dark which made it very difficult to locate the specimens, and, although they did not move until approached very closely, they usually ceased their song when disturbed. One which I succeeded in almost grasping escaped by tumbling down into the thick weeds under its perch.

New Scarabaeidae.

By H. C. Fall.

The present article was primarily designed to make known an interesting new species of *Thyce* discovered by Mr. G. H. Field, of San Diego, in the summer of 1906. The opportunity is taken, however, to add descriptions of two species of *Lachnosterna* and a *Polyphylla* which appear to be without names. The relation of each of these to previously described forms is easily made known, and there is therefore little use in awaiting monographic treatment of their genera of which there is either little need or small prospect in the near future.

Thyce fieldii n. sp.

Of the usual form, head and thorax piceous, elytra blackish brown, legs paler brown, vestiture pale ochreous. Head densely clothed with elongate scales and fine erect hair, prothorax and elytra with rather sparse recumbent acuminate scales, which are as a rule from two and one-half to three times as long as wide; sterna densely clothed with long cinerous or ochreo-cinerous hair, venter densely cinereo-squamulose. Clypeus sinuato-truncate (♂) or arcuato-truncate (♀). Prothorax four-fifths as long as wide, sides parallel in basal three-fifths, surface polished and finely rather sparsely punctate, especially toward the middle posteriorly; median line impressed and punctured. Elytra nearly parallel, finely feebly somewhat densely punctate, without costae; suture densely clothed with white scales. Length 22-23½ mm.

Male.—Antennal club subequal in length to entire stem, last joint of maxillary palpi fully three-fourths as long as the antennal club, with a broad, deep, oval excavation throughout its length. Front tibiae entirely devoid of teeth except the apical one. Outer claw of each tarsus with an acute tooth which is about one-third as long as the apical portion of the claw; tooth of inner claw of front tarsus about one-half as long as that of the outer claw; the disparity evident, but less marked on middle and hind feet.

Female.—Brown throughout, a little wider behind, vestiture sparser, clypeus smaller, the angles rounded; head with the vertex obtusely tumid. Antennal club about three-fourths the length of the preceding joints; last joint of maxillary palpus half as long as the antennal club; front tibiæ strongly bidentate; tarsi a little shorter; teeth of claws smaller than in the male, but showing nearly same disparity.

Five examples (4 males, 1 female) of this fine species are before me, all collected by Mr. Field, in the southern part of San Diego County, California.

The simple front tibiæ of the male, bidentate in the female, and the polished sparsely punctured thorax distinguish this species at once and remarkably from all previously described forms. It is dedicated with pleasure to its discoverer from whom I received one male taken in the summer of 1906, at Campo—elevation 2,400 feet. It was at once recognized as a new species and I wrote Mr. Field urging him to go for them again the following summer, when it was hoped females might be secured. A visit to the same region last July was successful, and Mr. Field has kindly sent me three more males and one female from his catch. Only two or three of

the latter sex were obtained. A short extract from a letter from Mr. Field relative to this trip will be of interest in this connection. He writes:—

"We started (from San Diego) June 29, and a hot spell started the same day we did. The first week was withering, blistering hot and, as we drifted along the Mexican border in the semi desert country, Hell could not have been more than a half mile off, and it wouldn't have surprised me at all to see old Mr. Devil sitting under a sage brush or greasewood. I cut out the Devil's canyon trip on account of the intense heat, and as it was impossible to take the horses any nearer than Mountain Springs, we actually could not have carried water enough to quench our thirst until we got back. I was obliged to make a long hot drive to reach the Thyce tree, but made it, and while supper was cooking I placed the cyanide bottles and nets by the tree to be prepared for an emergency call, but the infernal rascals did not come out till it was all but dark, and then they did come with a rush as they did before. There were not nearly so many out, but after the battle we counted thirteen slain."

Mr. Field narrates further adventures with the new *Thyce*—but this is sufficient to indicate some of the conditions incident to their capture.

Polyphylla fuscula n. sp.

Most nearly allied to *diffracta* Csy., but smaller and conspicuously darker owing to the sparse vestiture and subobsolete elytral vittæ. Head and entire disk of thorax clothed with erect hairs, these becoming sparser and shorter toward the sides of the latter; thoracic vittæ narrow and imperfect, the scaly vestiture pale yellowish in color throughout, not at all paler in the feebly condensed lines which represent the more or less strongly marked white vittæ of the related species. Antennal club about three-fourths longer than the stem. Pygidium squamulo-pubescent, the hairs and squamules not very densely placed, and both nearly evenly distributed over the entire surface, the lateral and apical margins only slightly reflexed. Front tibiæ bidentate (♂). Length 19-20 mm.

Chiricahua Mountains, Arizona.

Described from three males collected by Mr. V. W. Owen,

of Los Angeles, who has very kindly placed them at my disposal. In one example the elytral vittae are almost entirely wanting, in the others a little better defined. The antennal club is relatively shorter than in any of our previously described species. The shorter spur of the anterior tibia is about three-fourths the length of the longer one, and this seems also about the ratio prevailing in both *diffracta* and *crinita* notwithstanding Casey's statements of existing differences.

Lachnosterna lenta n. sp.

Oblong, scarcely wider behind, robust, not strongly convex, castaneous, legs paler. Clypeus feebly emarginate, border rather widely reflexed, surface moderately finely punctate, the punctures well separated; front similarly punctured, more sparsely at middle, in some examples. Thorax obliquely narrowed in front, sides subparallel posteriorly, margin finely crenate, punctuation coarse, close, and nearly evenly distributed. Elytral punctuation as coarse as or slightly coarser than that of the thorax, and equally dense; sutural costa distinct, discal costa faint but evident, marginal obsolete. Pygidium finely sparsely punctate, nearly smooth in the female. Metasternum hairy in both sexes, the hairs shorter and less dense in the female. Abdomen minutely remotely punctate. Last joint of maxillary palpus elongate fusiform, not impressed. Length 17-20 mm., width 10-12 mm.

Male.—Antennal club slightly longer than the entire stem; pygidium broader and evenly convex; abdomen flattened at middle, the penultimate segment with an arcuate or subangulate slightly roughened ridge a little behind the middle; last ventral broadly concave, smooth at apex; inner spur of hind tibia short, one-third to two-fifths the length of the outer one; ungual tooth smaller, acute, distinctly intra-median in position.

Female.—Antennal club shorter than the stem; pygidium smoother, more narrowly rounded and slightly tumid at apex; inner spur of hind tibia nearly as long as the outer; ungual tooth larger, median.

This species is a member of the *ephelida* group and should stand between *generosa* and *praetermissa*. It is closely related to the latter, differing in its rather more robust form, coarser, denser punctuation, somewhat more widely reflexed clypeus, the thoracic margin more evidently crenulate. The genitalia are quite distinct from the figures given by Smith, for *praetermissa*, the male claspers more complex as viewed

laterally. The pubic process in the female is long, slender, and forked at tip. In *praetermissa* the public process of the female is shorter and stouter, much as in Smith's figure for *villifrons,* the tips of the arms with two or three short setæ.

Described from 3 males, 1 female, taken at Mobile, Ala., by Mr. T. P. Loding, and sent me by Mr. Knaus.

Lachnosterna lobata n. sp.

Elongate cylindrical, not or scarcely broader behind, brown, elytra sparsely clothed with short erect hairs, few if any of which exceed in length one-fourth the width of the scutellum, and which are arranged for the most part along the costæ. Clypeus with a moderate cuspiform emargination, the border moderately reflexed, the surface together with that of the front densely but not coarsely punctate, the latter smoother along the clypeal suture. Prothorax nearly twice as wide as long, widest and rather strongly rounded at middle, sides a little sinuate both anteriorly and posteriorly, front angles acute, hind angles rectangular or very nearly so as viewed from above; margin not at all uneven, base and apex with marginal lines, side margins rather wider than usual; punctuation rather fine and not very close, the punctures as a rule distant by from one to two times their own diameter, somewhat sparser at middle; on each side an arcuate row of three foveiform impressions, of which the anterior within the front angles is largest and best defined, the posterior one nearer the base than the side, small and sometimes absent. Elytral costæ moderate, punctuation similar to that of the thorax but more vaguely impressed; pygidium rather coarsely rugose; metasternum finely densely punctulate and moderately densely hairy; free angle of hind coxal plate produced outwardly in form of a rounded lobe, which is visible from a dorsal view point. Abdomen very finely sparsely punctate, the fifth and posterior half of the fourth segment rather densely punctate; spurs of hind tibiæ slender, arcuate, free; claws with an acute median tooth. Length 17-18 mm., width 6¾-7 mm.

Male.—Antennal club subequal in length to joints 2-7; abdomen vaguely narrowly impressed along the middle, penultimate segment with a transverse impression posteriorly which is feeble at middle; last segment slightly flattened; pygidium broadly convex.

Female.—Antennal club as long as joints 3-7, abdomen convex, pygidium broadly transversely impressed subapically.

Chiricahua Mts., Arizona.

I am indebted to Mr. Schwarz for the four examples (1 male, 3 females) from which the above description is drawn. The species is a very distinct one and does not resemble at

all closely any previously described species of *Lachnosterna* with which I am acquainted. It possesses the characters which in Horn's synopsis define the *crenulata* group and may be placed at the end of that series, differing from all of them, and indeed from all known species of the genus in its prominent front thoracic angles, and in the form of the hind coxal plates. The terminal joint of the maxillary palpi may be best described as cylindro-ovate, differing more or less from all other species of the group, though nearest *aemula;* it is feebly impressed in the male, scarcely at all so in the female.

In the paper on *Listrochelus* by Dr. Horn,* the prolonged and acute free angle of the hind coxal plate is said to be a constant character in this genus, while in *Lachnosterna,* the angle is sometimes right, but never acute or prolonged. This is a mistake. Compare for instance *antennata, nitidula* and *tristis* of *Lachnosterna* with *disparilis, flavipennis* and *carminator* of *Listrochelus,* and the coxal angle will be found to be quite as prominent or even more so in the Lachnosternas. This structure then is no more distinctive than is the vertical carina or the ungual pectination, and there remains no single constant character for the separation of the two genera.

Notes on Sesiidae.

By Henry Engel.

Sesia bassiformis Walker.

During the summer of 1905, the Messrs. Kahl and Klages collected a number of specimens of this species at Ohio Pyle, Pa. Previous to these captures my only record of *bassiformis* from this section was a specimen given me by Mr. Knechtel.

The Ohio Pyle specimens were taken in a field where Iron Weed grew in abundance, either resting on the leaves of these plants or flying about in the field. This note furnished a clue to locate this species in my collecting grounds about Pitts-

*Trans. Am. Ent. Soc. VII, 1878, p. 138.

burg, Pa., during the summer of 1906. Extensive pasture fields, profusely covered with Iron Weed, are situated near my home, and late in 1905, I examined many of these plants and found the roots of a great many infested by larvæ.

During early August, 1906, I closely observed the Iron Weed in a field every evening on my way home from work. I usually arrived there about 5.45 P. M. which would seem late in the day for collecting Sesias. But this field had the benefit of the late afternoon sun and on August 13th, I observed three specimens and captured two of them. The following evening and up to September 9th, numerous specimens were taken. Imagos were on the wing from 10 A. M. to sunset. Pairs were taken in copulation from noon to 6 P. M. In one instance a female was observed to deposit an egg on the under side of a leaf. The larva enters the stem from 1-3 inches above base and bores down into the roots. Pupation occurs in the galleries beneath the surface in the old part of the root-stock, about the end of July. Period of flight, August 13th to September 14th.

In August and September, 1907, while employed at the Merrick Museum, New Brighton, Pa., I collected several dozen specimens in the vicinity of that town. By October 22nd, several frosts had occurred and the Iron Weed plants were killed. I took up several infected root-stocks and found the larvæ in various stages of development, ranging from 12-18 mm. long. The following description was taken from the larger larvæ.

Length, 18 mm., head 1.60 mm., wide, bilobed, light chestnut brown. Mandibles and ocelli dark brown. Front of head sparsely covered with light brown hairs. Thoracic shield pale brownish. Body semi-translucent, watery white. A brownish dorsal shade broadening on the somites and in the intersections. An indistinct whitish stigmatal line. Spiracles oval, light brown. Thoracic legs concolorous, clouded with pale brown outwardly. Abdominal legs concolorous, claws circular, light chestnut brown. Tubercles not prominent, in-

dicated by a short brown seta. Anal segment a little darker dorsally than ground color. Pupa is normal, light brown.

Food plant: *Vernonia,* Iron weed.

The food plant of *S. bassiformis* is given in the literature as *Eupatorium purpureum* Linn. or Joe-pie weed. This plant has been extensively explored by Mr. Bird, Mr. Merrick and the writer. While it is by no means free from insect depredations we have not observed it infested by the larva of *bassiformis* in this section.

Sesia pyralidiformis Walker.

This modest little species was encountered in a pasture field while I was searching for *bassiformis* on a very hot day in August, 1906. It was slowly flying along near the ground and settled on a dead daisy head. Several specimens were taken that day and a few more during later visits. All the specimens occurred in a comparatively small area which led me to the conclusion that its food plant would be among the plants in this field. About a month after I had taken the last specimen I went to this place and looked for its probable food plant. The only plants of any prominence were iron weed and boneset. As the former had disclosed a borer I commenced splitting the stems of boneset and soon observed the very neat gallery of a larva leading into the roots. Many plants were found to be infested but these larvæ were quite small, and after testing patches of boneset in different localities and finding these plants infested almost everywhere I concluded to wait until the following year to continue my observations.

During July, 1907, I discovered a patch of boneset in a field near New Brighton, Pa., in which about one-half of the plants harbored a larva. Several dozen plants were transplanted in a breeding cage, and on August 18th *Sesia pyralidiformis* disclosed its identity. About 30 specimens emerged from these plants, all appearing from 8-10 A. M. Copulation took place about one hour after emerging and lasted from 1 to 2 hours.

The imagos were very abundant in the locality where I

collected these plants and many specimens were taken as well as observations made on their habits. On sunny days they are on the wing from 10 A. M. to sunset. Often a female will rest on a leaf for a while then move to the edge and by bending the abdomen deposit a egg on the under side of the leaf. In several cases I observed females depositing an egg on a leaf near the head of the plant. Most of the ova are laid on the leaves near the stem about 6 inches from the base. The larvæ enter the stems from 1-2 inches above the crown of the stock and bore into the roots. The following year they continue feeding in the roots and work up into the new stems for about 1-2 inches where they prepare a place for emergence by eating through the side of the stems. Pupation takes place in the gallery. The larvæ mature from July 15-30th. The first pupa was observed on August 2nd. The moths were observed from August 7th to September 13th. They are most abundant about middle August. These observations however, were taken from the material observed at large and the specimen taken on August the 7th must have been in the pupa state about middle July. The average length of the pupa state is about 20 days. A description of the early stages as far as observed follows:

Ova.—Straw-yellow, oblong in shape, depressed flat surface at top and base, ovally rounded at the ends. The lower half is plain, the upper half ornamented by white lines in the form of irregular hexagonal net-work. Length 0.75 mm. Width 0.45 mm. Height 0.35 mm.

Larva, last stage.—Length 14 mm., head 1.50 mm. wide, rounded, slightly bilobed, light chestnut brown shading darker to the mouth parts. Edge of mandibles and the ocelli darker brown. Antennæ and spinneret light brown. Head sparsely covered with pale brown hairs. Body and abdominal legs dirty white. Thoracic shield, thoracic legs and claws on abdominal legs pale brown. Tubercles inconspicuous, indicated by single light brown setæ, I shorter than II, setæ slightly longer on anal segment. Along dorsum a semi-transparent line is evident, most conspicuous in the intersections. Anal plate tinged with light brown.

Pupa.—Light chestnut brown, with the usual chisel-shaped process developed on head. Spines on segments rather profuse.

Food plant: *Eupatorium perfoliatum* Linn., Thoroughwort or Boneset.

Sesia spec?—A species allied to *Sesia rutilans* Hy. Edw. but differing in several respects was reared from a stock of Sneezeweed, *Helenium autumnale* Linn., collected at New Brighton, Pa., by Mr. Henry Bird. The specimen emerged August 10th, 1907.

Mr. Bird kindly donated the specimen to the Merrick Museum.

Additional Records of Tabanidae (Horse-Flies) of North Carolina.

By C. S. Brimley and F. Sherman, Jr., Raleigh, N. C.

In Entomological News for October, 1904, the writers published a list of 40 species of Tabanidae then known from North Carolina. Continued collecting since that time has added 20 other species, some of them new, and all but one of which have been named for us by Prof. Jas. S. Hine, to whom we are under renewed obligations. We have, therefore, now on record a total of 60 species for the State, two of which (No. 40 of the 1904 list and No. 60 of the present list) have not yet been definitely located. *Tabanus allynii* has not been collected by the writers to date, but all the others have been taken by us or by assistants in the office of the junior author. Specimens of nearly all are in our collections. A few records from Pendleton in 1895 are from collections made by Mr. C. W. Johnson. Rev. A. H. Manee, at Southern Pines, N. C., has also collected somewhat in this family.

We have numbered these additional species consecutively with the 1904 list. The letters in parentheses after the name of a locality denote its geographical location in the State:—thus, E.=eastern, W.=western, C.=central, E. C.=east-central, etc. We also append new records as to the geographical or seasonal range of some of the species mentioned in the 1904 list.

1. ADDITIONAL SPECIES.

41. **Chrysops cursim** Whit.

Raleigh (E. C.). June 7 to July 17; C. S. Brimley and R. S. Woglum.

Havelock, (Lake Ellis) (E.). June 1905; May, 1906; Brimley. Seemingly not a common species.

42. **Chrysops dimmocki** Hine.

Pendleton (N. E.). Early June, 1895; C. W. Johnson.

Havelock (E.). Late May, 1907; Brimley and Sherman.

43. **Chrysops fallax** O. S.

All our reports of this species are for the months of June and July.

Raleigh (E. C.). June 5 to 18; taken by Brimley and Woglum.

Pendleton (N. E.) Early July, 1895; C. W. Johnson.

Hendersonville (S. W.). June, 1907; Sherman.

Highlands (S. W.). July, 1906 and 1907; Sherman.

Blowing Rock (N. W.). July 20, 1904; Sherman. This species probably occurs throughout the State.

44. **Chrysops montanus** O. S.

Only two specimens of this have been collected.

Raleigh (E. C.). June 5 and 18, 1906; Brimley.

45. **Chrysops nigribimbo** Whit.

Havelock (E.). Taken rather commonly by both writers in 1905, 1906, 1607, from late May to late June.

46. **Chrysops parvulus** Daecke.

Our three specimens are from two mountain localities, *Hendersonville* (S. W.) June, 1907, and *Highlands* (S. W.) July, 1907; Sherman.

47. **Chrysops separatus** Hine.

The type and only specimen of this species was taken by C. S. Brimley at *Raleigh* (E. C.) April 18, 1906. Described by Prof. Hine in Ohio Naturalist, December, 1907.

48. **Chrysops sequax** Will.

A species of rather late seasonal range.

Raleigh (E. C.). Not uncommon from July 9 to September 9; Brimley.

49. **Chrysops shermani** Hine.

Highlands (S. W.). July, 1906; July, 1907. Common and annoying on horse; Sherman.

Marion (W. C.). Mid-July, 1907; Sherman.

50. **Tabanus annulatus** Say.

Our two specimens are from the eastern section.

Havelock (Lake Ellis) (E.). July, 1905. Specimens sent in by J. J. Ballard.

51. **Tabanus exul** O. S.

Our three records are all from the central part of the State and all in July.

Pluck (C.). July, 1903; S. W. Poster.

Southwestern Alamance Co. (C.). July, 1905; Sherman.

Charlotte (C.). Late July, 1907; Sherman.

52. **Tabanus fuscopunctatus** Macq.

Havelock (Lake Ellis) (E.). Late May, 1907; L. L. Smith.

Southern Pines (S. E. C.). Mid-May and June, 1906; Rev. A. H. Manee,

53. **Tabanus hinei** Johns.

Havelock (Lake Ellis) (E.). Late May, 1907. Two specimens taken by C. S. Brimley.

54. **Tabanus lasiopthalmus** Macq.

Raleigh (E. C.). May 9, 1905; G. M. Bentley.

Havelock (Lake Ellis) (E.). May, 1906; Brimley.

55. **Tabanus longiusculus** Hine.

Raleigh (E. C.). Early July, 1903; Sherman.

Lagrange (E.). Mid-July, 1907; L. M. Smith.

Southern Pines (S. E. C.). Taken by Rev. Manee.

56. **Tabanus megerlei** Wied.

Southern Pines (S. E. C.). April, 1905; Sherman; mid-April, 1906; R. S. Woglum.

57. **Tabanus mexicanus** Linn.

This crepuscular or nocturnal species has been taken only at three localities in the eastern and southeastern sections of the State.

Wilmington (S. E.). 1905; Woglum.

Wallace (S. E.). June 4, 1904; R. W. Collett.

Havelock (Lake Ellis) (E.). Late June and July; a number sent by J. J. Ballard.

58. **Tabanus superjumentarius** Whit.

Hendersonville (S. W.). June, 1907; Sherman.

59. **Tabanus trispilus** Wied.

Pendleton (N. E.). June 7, 1895; C. W. Johnson.
Cashiers (S. W.). July, 1907; Sherman.

60. **Tabanus** Sp.

Two specimens not yet identified but clearly distinct from any here recorded, have been taken at *Southern Pines* (S.E.C.), probably by Rev. A. H. Manee, and are now with Prof. Hine for study. The eyes are hairy.

2. NEW RECORDS ON GEOGRAPHICAL DISTRIBUTION.

Only such localities are given as materially extend the known range of the species in the State, beyond what was recorded in our 1904 list.

Chrysops brimleyi Hine.

Originally taken at *Raleigh*, this species has now been taken both east and west, and is likely distributed throughout the State.

Havelock (E.). May, 1906; Brimley.
Hendersonville (S. W.). June, 1907; Sherman.

Chrysops callidus O. S.

Same dates and localities as for the preceding.

Chrysops celer O. S.

Southern Pines (S. E. C.). Mid-May, 1906; Foster.
Hendersonville (S. W.). June, 1907; Sherman.
Highlands (S. W.). July, 1907; Sherman.

Chrysops lugens O. S.

Haveloek (E.). Late June, 1905; Brimley.

Chrysops moechus O. S.

All our Raleigh records for this species as printed in the

1904 list properly belong to *C. niger*. One specimen of *moechus* has been taken at *Raleigh* (E. C.). Sept. 3, 1903; Brimley.

Lillington (E. C.). Early June, 1906; Sherman.

Hendersonville (S. W.). June, 1907; Sherman.

Chrysops niger Macq.

Probably distributed throughout the State.

Pendleton (N. E.). Early June, 1895; C. W. Johnson.

Hendersonville (S. W.). June, 1907; Sherman.

Highlands (S. W.). July, 1907; Sherman.

Chrysops obsoletus Wied.

Pendleton (N. E.). June, 1895; C. W. Johnson.

Highlands (S. W.). July, 1907; Sherman.

Chrysops univittatus Macq.

This species, recorded in the 1904 list only from central and east-central parts of the State, has now been taken in a number of new localities indicating general distribution in the State.

Chrysops vittatus Wied.

Our present records show this species to be in all parts of the State—the 1904 list indicated only eastern localities.

Diachlorus ferrugatus Say.

At the time our 1904 list was written but one example of this species had come into our hands, but in June, 1905, the writers found it to be both abundant and annoying as *Havelock* (E.).

Tabanus americanus Forst.

Present records indicate this species to be of general distribution in the State.

Tabanus cinctus Fabr.

The males of this handsome species have a habit of hovering in the air in the same manner as the carpenter-bees of the genus *Xylocopa*.

Southern Pines (S. E. C.). Early June and late May, 1906; Rev. A. H. Manee.

Highlands (S. W.). June, 1907; Sherman.

Tabanus coffeatus Macq.

Formerly recorded only from Raleigh, but our present records indicate distribution throughout the State.

Tabanus variegatus Fabr.

Tabor (S. E.). September, 1905; Woglum.

Tabanus wiedemanni O. S.

Lagrange (E.). Early August, 1904; Sherman.

Southern Pines (S. E. C.). Early July, 1904, and early June, 1904; Rev. A. H. Manee.

3. SEASONAL RANGE OF COMMONER TABANIDAE AT RALEIGH, N. C.

The species are arranged in the order of their appearance in the year, beginning with the earliest-appearing forms and closing with those that appear latest in the season. Based on the observations of C. S. Brimley.

C. brimleyi, April to May 18, one on June 18.
C. niger, May 2 to June 13.
C. callidus, May 2 to Sept. 13.
T. carolinensis, May 2 to May 13.
T. pumilis, May 7 to Aug. 17.
C. celer, May 7 to May 13.
C. univittatus, May 7 to Sept. 9.
C. carbonarius, May 15 to June 15.
C. lugens, May 18 to Aug. 16.
C. flavidus, May 20 to Oct. 18.
T. lineola, May 25 to Sept. 18.
C. obsoletus, May 26 to Oct. 1.
C. vittatus, May 26 to Oct. 10.
T. fulvulus, May 28 to July 10.
T. cerastes, May 29 to June 20.
T. stygius, May 30 to July 10.
C. fallax, June 5 to June 18.
C. cursim, June 7 to July 17.
T. molestus, June 7 to July 20.
T. melanocerus, June 7 to July 17.
T. trimaculatus, June 17 to July 23.
C. fulvistigma, June 11 to July 25.
T. atratus, June 11 to Oct. 11.
T. coffeatus, June 13 to July 23.
T. americanus, June 19 to Aug. 18.
T. fronto, July 4 to Sept. 17.
C. sequax, July 9 to Sept. 9.
T. longus, July 14 to Sept. 13.
T. variegatus, Sept. 2 to Oct. 29.

New North American Pachyrhina, with a Table for Determining the Species.

By R. W. Doane, Stanford University.

In working over the large series of *Pachyrhina* that have come to me from time to time I have found it desirable to revise Loew's table (Vehr. Zool-Bot. Ges. 1879, 513-516) to include the Mexican species and other species that have since been described. Believing that it may prove helpful to some, especially as Loew's table is not easily accessible to all, I give

my table here together with descriptions of four undescribed species, including two of our most common California forms.

I have not seen specimens of *P. affinis* Bell. or *P. excelsior* Berg. and cannot from the descriptions select any characters which would not apply equally well to some of my specimens of *P. incurva* Lw. so these three species are placed together in the table until further study shall show some characters by which they may be separated. *P. occipitalis* Lw. occurs in two places as in the original table, as I find that desirable on account of the occiput being more or less shining, sometimes almost opaque.

1. Thorax wholly black . . . . . 2.
   Thorax not wholly black . . . . . 3.
2. Abdomen altogether black . . . . . **altissima** O. S.
   Abdomen reddish-yellow toward the base . . . . **erythrophrys** Will.
3. Thoracic stripes black . . . . . 4.
   Thoracic stripes brownish or reddish, sometimes obsolete . . . . 18.
4. Wings hyaline . . . . . 5.
   Wings with a yellowish or brownish tinge . . . . . 12.
5. Anterior end of the lateral stripes curved . . . . { **incurva** Lw. / **affinis** Bell. / **excelsior** Berg.
   Anterior end of the lateral thoracic stripes not curved . . . . . 6.
6. Pleura without spots; occiput without a black spot . . **virescens** Lw.
   Pleura with spots . . . . . 7.
7. Pleura for the most part cinereous . . . . . **collaris** Say.
   Pleura not cinereous . . . . . 8.
8. Pleura yellow, with yolk-yellow spots . . . . . **ordinaria** O. S.
   Pleura variegated with brownish fuscous or blackish spots . . . . 9.
9. Head wholly black . . . . . **californica** n. sp.
   Head yellow, with a black spot on the occiput 10
10. A small black spot between the antennæ; the black spot on the occiput does not reach over the vertex . . . . . **pedunculata** Lw.
    No spot between the antennæ; the black spot on the occiput reaches over the vertex . . . . . 11.
11. Pleura variegated with several fusco-blackish spots, posterior margin of the eighth sternite of male only gently curved . . **vittula** Lw.
    Pleura sulphur-yellow, with only one or two reddish-brown spots; posterior margin of the eighth sternite of male with a deep V-shaped incision . . . . . **snowii** n. sp.
12. Wings with a brownish or brownish-yellow tinge . . . . . 13.
    Wings with a yellowish tinge, at least along the anterior margin . 14.

13. Anterior ends of the lateral stripes of the thorax curved out. **lineata** Scop.
Anterior end of lateral stripes not curved out . . . . . **lugens** Lw.
14. Antennæ for the most part black or fuscous . . . . . 15.
Antennæ yellowish, darker toward the tip . . . . . **consularis** O. S.
15. Pleura and metanotum spotted . . . . . 16.
Pleura and metanotum without spots . . . . . **noblis** Lw.
16. An opaque spot on the lateral thoracic stripes . . . . **nigrolutea** Bell.
No opaque spot on the lateral thoracic stripes . . . . . 17.
17. Rostrum shining black above, yellow below . . . . . **usta** O. S.
Rostrum yellow . . . . . **mexicana** Macq.
18. Thoracic dorsum opaque . . . . . 19.
Thoracic dorsum shining . . . . . 22.
19. Stigma brown . . . . . 20.
Stigma yellowish . . . . . 21.
20. Lateral margins of the lateral thoracic stripes with three velvety-black spots. . . . . **elegantula** Will.
Lateral thoracic stripes without black spots . . . . **unimaculata** Lw.
21. Antennæ longer than usual . . . . . **macrocera** Say.
Antennæ shorter than usual . . . . . **tenuis** Lw.
22. A velvet black spot at the anterior end of the lateral thoracic stripe. **punctum** Lw.
No velvet black spot at the anterior end of the lateral thoracic stripe . . . . . 23.
23. Joints of the flagellum, except the basal ones, blackish . . . . . 24.
Joints of the flagellum in two colors . . . . . 30.
24. Occiput altogether shining . . . . . 25.
Occiput opaque, with a shining triangular spot in the middle.
25. Cross-veins clouded . . . . . **unifasciata** Lw.
Cross-veins not clouded . . . . . 26.
26. Front and occiput unicolorous . . . . . **sodalis** Lw.
Front and occiput with a black stripe . . . . . **occipitalis** Lw.
27. Thoracic suture colored with black at both ends . . . . . 28.
Thoracic suture not colored black . . . . . 29.
28. Posterior margin of the eighth sternite of the male with a rather deep rounded incision, the edges of which bear long yellow hairs. **occidentalis** n. sp.
Posterior margin of the eighth sternite of the male straight or nearly so, yellow hairs much shorter and sparser . . **ferruginea** Fabr.
29 Stigma brownish-yellow . . . . . **occipitalis** Lw.
Stigma blackish-brown . . . . . **gracilicornis** Lw.
30. Joints of the flagellum black at the base . . . . . 31.
Joints of the flagellum yellow at the base . . . . . 35.
31. Occiput without distinctly defined shining triangle. . **xanthostigma** Lw.
Occiput opaque, with a distinct shining triangle . . . . . 32.
32. Costal cell colorless, stigma dark brown . . . . . **abbreviata** Lw.
Costal cell colored, stigma yellowish-brown . . . . . 33.

33. Thoracic suture tinged with black . . . . . 34.
Thoracic suture tinged with reddish-brown . . . . **circumscripta** Lw.
34. Anterior end of lateral thoracic stripes curved . . . . **wulpiana** Berg.
Anterior end of lateral thoracic stripes not curved . . . **saturalis** Lw.
35. Antennæ with more than thirteen joints in both sexes . . . . . 36.
Antennæ with thirteen joints . . . . . **breviorcornis** n. sp.
36. Stigma yellowish-brown, apex of the wings not distinctly infuscated.
eucera Lw.
Stigma dark brown, apex of the wings distinctly infuscated.
polymera Lw.

Pachyrina californica n. sp.

Yellow; head wholly black, opaque; sides of rostrum somewhat yellow; palpi black; first three segments of antennae yellow, the third sometimes darker toward the tip, other segments black, rather swollen at the base, with short stiff verticles; in the female, the 4th and 5th segments of the antennae are more or less yellow; ground color of the thorax bright yellow, shining, stripes shining black, median stripe broad, not extending back of the suture, lateral stripes reaching to the scutellum, not curved anteriorly; thoracic suture black in the middle; dorso-pleural suture black; dorso-pleural membrane yellow; collare yellow with median and lateral black spots; pleura black anteriorly, yellow posteriorly; scutellum and metanotum yellow with a median black line; halteres yellow, knobs brown; coxae black; femora and tibia yellow, black at the tips; tarsi blackish; abdomen yellow with rather broad black lines dorsally, ventrally and laterally; segments 6, 7, and 8 sometimes almost wholly black; hypopygium reddish brown; posterior margin of the eighth sternite of the male produced into two small triangular processes which bear dense tufts of rather long reddish-yellow hair; posterior margin of the large ninth tergite blackish, with a deep semi-circular incision, posterior lateral margins with a small deep U-shaped incision; ovipositor reddish-black at the base, valves short, straight, blunt; wings hyaline with a faint whitish spot in the region of the stigma; veins, stigma, and more or less distinct spots just back of the stigma, over the origin of the praefurca and over the base of the basal cells brown; a faint hardly perceptible cloud in all the cells; petiole of the 2nd posterior cell as long as the anterior cross-vein. Length, male, 15 mm, wing 13 mm., female, 18 mm., wing 14 mm.

Hab.—Stanford University, Cal. Many males and females. A single poorly preserved specimen from Pullman, Wash., seems to belong with this species.

Pachyrhina snowii n. sp.

Yellow; head orange yellow, shining, somewhat lighter below; the

broad black shining band on the occiput and the vertex attenuated anteriorly; a small indistinct reddish-brown spot above each eye; rostrum yellow with a brown spot on each side close to the base; palpi brownish, lighter at the joints; first two segments of the antennae yellow, others wholly brownish-black, middle segments slightly excised below; thorax sulphur yellow; dorsal stripes black, shining, the median one slightly dilated anteriorly; collare orange-yellow in the middle, blackish or brownish on the sides; a small back dash in the dorsal-pleural membrane just before the base of the wing; pleura sulphur-yellow, variegated with one or two reddish-yellow spots; scutellum reddish-brown; metanotum yellow with a faint reddish-brown spot posteriorly; halteres brownish-yellow, darker toward the tip; coxae and base of femora light yellow; femora and tibia brownish-yellow, black at the tips; tarsi black; abdomen yellow with dorsal, lateral and ventral, interrupted black stripes; eighth and ninth tergites of male wholly black; eighth sternite black, the posterior angles and a narrow border of the deep V-shaped incision yellowish, posterior angles bearing a few yellow hairs of moderate length; appendages of the hypopygium yellow; eighth segment of female black, ovipositor reddish-yellow, upper valves long, slender, very slightly decurved at the tip, lower valves not reaching to the tip of the upper valves; wings hyaline; costal and subcostal cells with a slight yellowish tinge; stigma brown; second posterior cell sessile. Length, male 13 mm., wing 13 mm., female, 14 mm., wing 13 mm.

Hab.—Wyoming. One male, one female.

Much like *P. vittula* Lw. but may be distinguished by the fewer lighter markings on the pleura and particularly by the deep V-shaped incision on the posterior margin of the eighth sternite of the male.

Pachyrhina occidentalis n. sp.

Yellow; head opaque, orange-yellow above, much lighter yellow behind the eyes and below; occiput with an arrow-shaped brownish spot; rostrum, palpi and first three segments of antennae orange-yellow, remaining segments of antennae dark brown; palpi darker toward the tip; thorax light yellow, dorsal stripes brownish-yellow or reddish-yellow, broad, shining, the lateral ones expanding somewhat anteriorly; the sides of the collare, the coxae and irregular spots on the pleura, brownish or reddish-yellow; thoracic suture marked with black at both ends and with a black spot in the middle; three black spots along the dorso-pleural membrane, the first just back of the collare, the second a short distance in front of the wing and the third at the base of the wing; scutellum and metanotum with a broad, reddish-yellow stripe; halteres yellowish at the base, darker toward the tip,

knobs brownish; femora and base of tibiæ brownish-yellow, tibiæ growing darker toward the tip; tarsi brown, terminal segments almost black; abdomen brownish-yellow, darker posteriorly, posterior and lateral margins of the segments but slightly darker; the eighth sternite of the male long, broad, conspicuous, the posterior margin with a rather deep rounded incision, the edges of which bear a conspicuous fringe of long yellow hair; posterior margin of the ninth tergite with a small V-shaped incision, the edges of which are black; ovipositor reddish-yellow, upper valves straight, tips rounded, lower valves not reaching the tips of the upper valves; wings hyaline; stigma brown, more or less distinct; second posterior cell sessile or with a very short petiole (in two of my specimens this cell is broadly sessile in one wing, and with a very short petiole in the other wing). Length, male, 11 mm., wing, 11 mm.; female, 15 mm., wing, 15 mm.

Hab.—Central and Southern California, Montana, Eastern and Western Washington, Nevada, Arizona. (type from Stanford University, Cal.) Many males and females.

This species is very like *P. ferruginea* of the eastern United States and doubtless is the one that has been recorded from California as *ferruginea*. The long, broad eighth sternite of the male with its deeply cleft, long-haired posterior margin at once separates it from *ferruginea* in which this sternite is only slightly curved or cleft along the posterior margin and is provided with much shorter sparser hairs. The specimens from Arizona and one of the Washington specimens have the anterior lateral margins of the median thoracic stripe bordered with brown and in some the anterior ends of the lateral stripes are also marked with brown. The brown spot on the occiput is sometimes quite indistinct, in other specimens it is well marked, sometimes drawn out into a narrow line anteriorly. In a few of the specimens the tip of the knob of the halteres is yellowish. The palpi are sometimes wholly yellow and the 4th, 5th, 6th segments of the antennae of the female are usually more or less yellow.

Pachyrhina breviorcornis n. sp.

Yellow; head yellow, with a brownish tinge and a small triangular brown spot above, lighter behind the eyes; rostrum yellow, brown on the sides; palpi yellow; antennae with thirteen segments, first and second wholly yellow, third elongate, basal half yellow, distal half brown,

segments four to twelve brown with the basal one-fourth or less yellow, all gently excised below, with a dense soft pubescence and a whorl of moderately long hairs, only four or five hairs in each whorl, thirteenth segment short, conical, wholly brown; thorax yellow; dorsal stripes reddish-brown; pleura light yellow, a spot below the wing brownish yellow; scutellum yellow with a brownish tinge above; metanotum yellow; halteres brownish, lighter at the base, knobs darker; coxae brownish yellow; legs yellowish-brown, tarsi and tips of femora and tibiæ darker; abdomen brownish yellow, darker posteriorly, with dorsal, lateral and ventral rows of black spots, those on the dorsum less distinct posteriorly, hypopygium small; eighth sternite with a rather deep U-shaped incision; wings with a faint yellowish tinge, costal and subcostal cell yellowish, stigma darker yellow; second posterior cell sessile. Length, 14 mm., wing 13 mm.

Hab.—Battle Creek, Mich. One male.

Somewhat like *P. eucera* Lw. but antennae only thirteen segmented, last segment shorter and the middle segments not so deeply excised. The second posterior cell in *eucera* is subject to considerable variation, in some of the specimens before me this cell is broadly joined to the discal cell, in others it has a short petiole, in a few the petiole is as long as or longer than the anterior cross vein.

Some Oxybeline Wasps from New Mexico.

By S. A. Rohwer and T. D. A. Cockerell.

Oxybelus fossor n. sp. ♀ Length 4½ mm. Head and thorax deeply and densely punctured, the punctures on the vertex sparser, mesothorax shining but very strongly punctured; face, cheeks and pleura with silvery pubescence; prothorax not strongly carinate; mesonotum without depression; scutellum and postscutellum with medial longitudinal carina; mandibles except tips, narrow margin of prothorax at sides, tegulae, squama and two spots in front and spine white; antennae (flagellum darker above), legs except coxae, four anterior trochanters, line on intermediate femora above and the anterior femora above rufous; abdomen clear red, shining, sparsely punctured (the punctures denser beyond the second segment), thinly clothed with white pubescence; a broad band on first abdominal segment squarely interrupted in the middle, a linear rudimentary band on second and third segments creamy white; the medial depression of first segment is indistinct. Wings milky hyaline, nervures pale ferruginous.

Hab.—Mesilla Park, N. M. College campus, June 7, '99 (Ckll.). "Digging in sand."

Related to *O. abdominalis* Baker, from which it may be known by its larger size, shining abdomen, with the punctures on the second segment more widely separated; the pale ferruginous, instead of dark brown, venation and the narrower spine.

Oxybelus townsendi n. sp. ♂. Length 5 mm. Head and thorax rather densely but finely punctured, covered with fine silvery pubescence which is denser on the face, cheeks, prothorax and upper posterior face of metathorax; clypeal process prominent; mesonotum without depression; scutellum and postscutellum carinated, postscutellum not so strongly; squama rising from side of postscutellum, short, strongly curved and sharply pointed; spine rounded at tip and slightly broader, grooved above until apical third; areas of the metathorax well defined, posterior face surrounded by a ridge, on posterior face below spine is an oval shining fovea; abdomen finely punctured, first segment somewhat truncate at base, the medial depression broad but distinct, second segment with a narrow transverse basal depression. Color black; mandibles at tip piceous; antennae, mouth parts, base of tegulae, anterior tibiae and tarsi dull rufous; eyes (dry) pale yellowish brown; squama pallid; first, second and third abdominal segments on apical margin dull white; first on each side with a line of yellow; a yellowish spot on base of hind tibia; three apical segments and narrow apical margin of the one before rufous; abdomen with sparse silvery pubescence. Wings hyaline, nervures brown.

Hab.—Las Cruces, N. M., August 30. Flowers of *Solidago canadensis*. Dedicated to Prof. C. H. T. Townsend, who collected it.

This species has its nearest ally in *O. similis* Cress., from which it may be separated by the different shape of the postscutellum, its being feebly carinated; fovea in face of metathorax not produced beneath, the abdomen evenly punctured throughout; pubescence on mesothorax silvery and other color characters.

Accompanied on the flowers by *O. sparideus*, *O. emarginatus* and *O. cornutus*.

Belomicrus cladothricis Ckll., on *Croton*, between Rowe and old Pecos Pueblo, N. M., Sept. (W. P. Ckll.). This extends the range a long distance northward.

ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

To Contributors.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, three weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form, will be given free, when they are wanted; and this should be so stated on the MS., along with the number desired. The receipt of all papers will be acknowledged.—ED.

PHILADELPHIA, PA., APRIL, 1908.

"Let us never forget the debt we owe to the pioneers of science. The results of the dearly bought experience of the past form a solid foundation of fact upon which we now stand firmly and confidently, to enter upon new fields of investigation. The status of entomological research to-day is far different from what it was even ten years ago. The number of devotees to these attractive studies is easily a hundred-fold greater than then."—JAMES FLETCHER.

Entomology is doing great things but we see no busts of entomologists in the Halls of Fame. At the meeting of the A. A. A. S., in New York, it was suggested to the President of one of our great scientific institutions that the Hall of Fame in the American Museum of Natural History, should contain a bust of Thomas Say, whereupon he said he had never heard of such an individual. Dr. Fletcher is perfectly right in what he says, and we all honor those who have blazed the trail, but few honors have come to entomologists. Perhaps we should rise superior to what may be termed empty honors and glory in the knowledge of the value of our study and its great interest to mankind, now and for what it will be in the future.

Entomological Literature.

DIE HYMENOPTEREN MITTELEUROPAS, NACH IHREN GATTUNGEN UND ZUM GROSSEN TEIL AUCH NACH IHREN ARTEN ANALYTISCH BEARBEITET. By Dr. Otto Schmiedeknecht. Pp. 804, with 120 text figures. (Jena 1907, Verlag von Gustav Fischer.)

The present extensive treatise although it does not deal directly with the fauna of North America, is one which will be very useful to students of Hymenoptera in this country. Since the publication of Cresson's Synopsis twenty years ago, no single comprehensive work has been available for the use of American entomologists desiring to begin the study of this complex and interesting group of insects. During this time many new genera have been discovered, and other European ones found in America, until at the present time there is a great deal lacking in the synopsis which will be in great part supplied by the new work.

Professor Schmiedeknecht has classified all of the families down to genera, and as the genera occurring in the United States and in central Europe are in most cases very nearly the same, this part of the volume may be applied to the classification of our own fauna with the most gratifying results.

On account of the large number of species included in the parasitic groups, these have been in most cases only generically classified, although specific tables for genera of special interest like *Ichneumon* and *Gasteruption* are given in complete form. Specific tables are however given for all the wasps and bees and the Chalastogastra, but they are of no aid to American entomologists, for an extremely small number of species are common to the two continents.

On the whole the work seems to embody the current views of the foremost workers in each group, which allows of a much more representative and conservative treatment than would otherwise have been possible. Only twenty-two families are recognized. The author's own familiarity with what is no doubt the most difficult family, the Ichneumonidæ, makes this part of the book especially valuable.

Each family and other of the larger groups is described at some length, with figures of wings and other diagnostic parts and also with references to available literature.

In short, the volume is a storehouse of much that will prove useful to American as well as European entomologists, and should be in the hands of all actively interested in the classification of these insects.—C. T. BRUES.

MESSRS. HEBARD AND REHN are trying to tell from the appearance of the map of the United States where the most new species of Orthoptera may be found. They are planning an expedition.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

MR. H. W. WENZEL is contemplating a collecting trip to the Muskoka Lake region in search of Coleoptera.

THE Report of the Entomological Society for Ontario, for 1907, is an interesting and valuable document. Great activity is being shown by our Canadian brethren.

PROFESSOR V. L. KELLOGG, of Stanford University, will be in Europe from April to December of this year. His address is, care French, Lemon & Co., Florence, Italy.

DR. P. P. CALVERT delivered an interesting course of lectures in the Ludwick Institute course, at the Academy of Natural Sciences of Philadelphia. His subject was "Studies in the Natural History of Mexico and Central America."

LIST OF PUBLICATIONS OF THE BUREAU OF ENTOMOLOGY, Washington, D. C. Under this title, Circular No. 76 of the Bureau, revised to March 1, 1908, is republished with 28 pages, an increase of 7 pages over the first edition. It is a most helpful guide through the maze of Annual Reports, Bulletins—old, new and technical series, Circulars—first and second series, Special Reports, Bulletins and Reports of the U. S. Entomological Commission, Insect Life, Farmers' Bulletins relating to Entomology, Yearbook articles, Miscellaneous Reports and other publications of the variously organized entomological activities of the U. S. Government. It has been compiled by Miss Mabel Colcord, Librarian of the Bureau.

ERRATA VOL. XIX.

Page 2, line 16, for .023, read .23.
" 2, " 17, for .014, read .14.
" 3, " 11 from bottom, for 70 read 20.
" 96, " 8, for ♀ read (♀).
" 97, " 16, after pronounced, insert tubercle, so as to read pronounced tubercle.
" 97, " 22, should read, This species differs from a typical *Xanthacrona*, etc.
" 99, " 19, for (*acrotoxa*) read (*Acrotoxa*).
" 126, for *Cyrtophillites* read *Cyrtophyllites*.
" 126, second line of description, for 55 mm. read 50 mm.
" 126 and 127, for *Lythymnetes* read *Lithymnetes*.
" 127, for *Tetrachoncha* read *Tetraconcha*.

Doings of Societies.

The Brooklyn Entomological Society met January 9th, seventeen members being present. Of the old officers, President J. L. Zabriskie, and Recording Secretary, G. P. Engelhardt, declined re-election. The following new officers were elected unanimously:

President, R. F. Pearsall; Vice President, E. L. Graef; Treasurer, C. H. Roberts; Recording Secretary, R. P. Dow; Corresponding Secretary, A. C. Weeks; Librarian, J. J. Levison; Curator, Geo. Franck; Delegate to the New York Academy of Sciences, John B. Smith; Field Committee, appointed by the Chair.

Mr. Weeks read a paper upon "The Economic Value of the Vespertilionidæ (Insectivorous Bats)" with suggestions as to their preservation and propagation, and gave a summary of his observations upon a large colony of these creatures which were domiciled in the roof of his summer residence on Long Island last year, together with his opinion that as destroyers of noxious insects they were superior to the whip-poorwill and nighthawk, and the several species of owls and nocturnal animals and reptiles. Nothing could be said to their prejudice, while moreover they were free from the faults of many partially insectivorous birds, in that they did no injury to poultry or other useful birds, fruit or vegetation. They were practically on the alert throughout each night during the insect season and by hibernation or emigration during the cold period required no artificial care. Bats are able to capture many species of injurious moths which in both the larval and mature stages are so well concealed during the day that they cannot then be readily taken. Several methods of constructing artificial shelters for refuge to bats and their propagation were suggested to take the place of natural hiding places in hollow trees which were now rapidly disappearing, with a recommendation that bats be protected by law and that the U. S. Department of Agriculture, through the co-operation of its Divisions of Biology and Entomology cause a for-

mal and detailed investigation to be made along the lines set forth in the paper, and if deemed of sufficient importance, that a Farmers' or other Bulletin, embodying the results be prepared and distributed.

Professor J. B. Smith noted that bats keep close to the woods and take their prey entirely on the wing, hence were not likely to be valuable as destroyers of the gypsy moth, the brown tail and female moths generally, before the egg laying. Mr. Dow had observed while collecting under electric lights, that a majority of moths caught by the bats were arctiids.

Mr. Olsen then related a beautiful example of maternal solicitude. He had encountered a party of boys stoning a wood bat, *Vespertilio novaeboracensis*. The animal neither flew nor resisted but held her wings folded around her body. On rescuing her, he discovered a new born young one within the sheltering wings. The helpless mother had stayed to face death for its sake. Olsen made a nest of leaves in his hat. On arriving home, he found the mother and three young.

G. P. ENGELHARDT, *Secretary.*

At the Twentieth Anniversary Meeting of the Feldman Collecting Social, which was held at the home of the Secretary, at Wissahickon, Philadelphia, Pa., December 28, 1907, the following members were present: Dr. Henry Skinner, Prof. Philip P. Calvert, Philip Laurent, Albert Hoyer, Henry W. Wenzel, Dr. D. M. Castle, Frank Haimbach, Theo. H. Schmitz, Henry S. Harbeck, Erich Daecke, Wm. S. Huntington, H. A. Wenzel, H. A. Kaeber, George M. Greene and Henry L. Viereck, also Mr. Chas. Greene, visitor.

Letters were read from Chas. W. Johnson and C. Few Seiss, members, and Wm. Beutenmüller, Edgar L. Dickerson, John A. Grossbeck and W. D. Kearfott, to whom invitations had been extended, expressing regrets at not being able to attend Anniversary meeting.

Professor Calvert read a paper by Vernon E. Shelford, of

the University of Chicago, on the distribution of Tiger Beetles and their egg-laying habits. The subject was discussed by the members, more particularly by Mr. Henry W. Wenzel and Dr. Henry Skinner. Prof. Calvert spoke about *Leptinotarsa,* and said that in different years the species varies according to Dr. Tower.

Mr. Daecke exhibited specimens of *Pamphila arogos* Bdl. & Lec. taken at Brown's Mills Junction, N. J., July 21, 1907. This species has also been taken at Lakehurst, N. J. (Davis), before which it had only been reported from Gulf States, Iowa and Nebraska. The geographical distribution of Pamphilas was discussed by the members.

The meeting then adjourned, and after a musical program furnished by Mr. Haimbach, Jr., a collation was served, which was very much enjoyed by all those present, and upon which occasion the President read an address to the members; addresses then followed by each of those present and the Twentieth Anniversary Meeting was pronounced a grand success.

FRANK HAIMBACH, *Secretary.*

At the meeting of the Feldman Collecting Social held January 15, 1908, at the residence of Mr. Henry W. Wenzel, No. 1523 S. 13th Street, Philadelphia, there were thirteen members present.

The following officers were nominated and elected to serve during the year 1908: President, Erich Daecke; Vice President, Henry S. Harbeck; Treasurer, Henry W. Wenzel; Secretary, Frank Haimbach; Assistant Secretary, George M. Greene.

The President read his annual address, which was ordered incorporated in the minutes.

The Treasurer's report was read, and ordered filed.

The Secretary submitted a verbal report, which was accepted.

Mr. Schmitz presented a specimen of *Thecla halesus* Cram., taken in a room of his home on January 8th. It was sug-

gested that the pupa of this insect was brought North in a fruit basket, and as January is its time of emergence in the South its presence here was only accidental.

Dr. Castle spoke of his trip last summer to the mountains near Harrisburg, Pa.

Mr. Wenzel exhibited H. A. Wenzel's collection of Anthicidae, from Southern Arizona, among which are probably several new species of *Xylophilus*.

Mr. Greene reported the finding of *Hololepta* sp. and *Cucuja flavipes*, under bark, in the early part of this month.

Mr. Seiss spoke about *Eros aurora*, and said that only one specimen had been seen and taken at Island Heights, N. J., on May 5, 1907, and that very few were seen in May, 1906, while hundreds were taken in April and May, 1905.

Mr. Wenzel thought that the large gathering of *Eros aurora* was not caused by food, but probably by the presence of a number of females; the speaker had noticed other species of Lampyrids under similar conditions.

Dr. Castle said that he collected one or two specimens of *Telephorus longulus* Lec. at Enterprise, Fla., and that no others were seen at that time, while several days after he took several thousand with one sweep of net.

Mr. Harbeck exhibited a specimen of *Trichocera regelationis* Linne. This is a European species and, according to Aldrich, has only been taken in this country, in Greenland, and British Columbia. It was taken in numbers on November 19, 1907, by Messrs. Philip Laurent, at Mt. Airy, and F. M. Arthur, at Logan, Pa.

Mr. Bland described the nature of the country about his New Jersey home at Little Silver, Monmouth County, the chief industry of which place is floriculture.

FRANK HAIMBACH, *Secretary*.

At the meeting of the Feldman Collecting Social held February 19, 1908, at the residence of Mr. H. W. Wenzel, No. 1523 S. 13th Street, Philadelphia, thirteen members were present, and Messrs. Kearfott and Classen, visitors.

Mr. Kearfott exhibited his card index system, upon which he is collecting data pertaining to the Tortricidae of the world. The original descriptions of genera and species are given, as well as venation, head and palpi, and other structural details.

Mr. H. W. Wenzel exhibited a number of specimens of *Macrobasis ochrea* from Southern Arizona, all in coition. Each male had selected a female of exact size of itself; the species has a tendency to vary greatly in size.

Prof. Smith said that he would make a microscopical examination of the sexes, and report his findings at the next meeting.

Among the Lepidopterous collection from Southern Arizona, made by Messrs. Wenzel, Jr., and Kaeber, which Prof. Smith determined for Mr. Haimbach, the Professor pointed out as of especial interest, specimens of *Mamestra palicauda* Sm.; this species has a white anal tuft, being the only one of this genus with that characteristic.

Mr. Daecke exhibited specimens of *Pamphila dion* Edw. taken at Brown's Mills, N. J., September 15, 1907.

FRANK HAIMBACH, *Secretary*.

A meeting of the Newark Entomological Society was held January 12, 1908, in the Turn Hall annex, with seventeen members present.

Mr. Samuel Henshaw, of Cambridge, and Mr. Otto Buchholz, were tendered thanks for generous donations toward the library.

Under the topic of "Variation in Insects" Mr. Buchholz exhibited a series of over sixty specimens of *Arctia nevadensis*, showing all variations and named varieties.

Mr. Brehme exhibited specimens of *Neonympha henshawii*,

illustrating extremes in coloration. Mr. Grossbeck showed a box of Geometrids and spoke of the great amount of variation many of the species displayed. Especially interesting was a specimen of *Therina fiscellaria,* in which the two normally widely separated cross-lines anastomosed and parted at the point of juncture, thus forming a quadrangle with the costa and a triangle with the inner margin. A similar case was that of *Mesoleuca gratulata,* where the basal and outer fields joined centrally, having a small white costal and inner marginal spot to represent the usual broad median area. Mr. Broadwell had a fine series of *Telea polyphemus,* showing the gradual variation from pale yellow to dark reddish individuals.

JOHN A. GROSSBECK, *Secretary.*

A meeting of the Newark Entomological Society was held February 9, 1908, with eighteen members present and Mr. Henry Dietz, of New York, a visitor.

Mr. Brehme read a paper entitled "Notes on Some Saturniidæ" in which he spoke of the large percentage of dead caterpillars in the cocoons he had collected last fall. *Samia cecropia* fared worse than all other species in this respect, scarcely 4½ per cent. containing live pupæ, and, of the dead ones only 1 per cent. of those examined were infested with parasites. *Telea polyphemus* unlike *S. cecropia* died mostly in the larval stage, and just before the season of pupation hundreds of larvae could be seen hanging limp from the branches of their food-plants. Of those that succeeded in forming cocoons 60 per cent. were invalid, and, as in the case of *cecropia,* died before pupating, though the inner as well as outer wall of the cocoon was fully formed. *Promethea,* on the other hand, seemed not to be affected by disease at all and even escaped to a remarkable degree the usual infestation of parasites. *Cynthia* was not inclined more in one direction than in another and the percentage of good cocoons remained at a par with former years.

In discussing the paper Mr. Erb bore out Mr. Brehme's

statements in regard to the dead and dried up larvae in the *cecropia* and *polyphemus* cocoons. Mr. Doll said that infestation was a purely local one, since in one locality on Long Island, all of nine hundred to one thousand *cecropia* cocoons were dead, while in another only a short distance away, he secured over sixteen hundred good ones. Mr. Zaiser related a somewhat similar experience where at Canarsie, Long Island, all those cocoons of *cecropia* collected close to the seashore, contained living pupæ, while those some distance back from the coast, proved to be dead. He thought the influence of the salt air might have been responsible in keeping the parasites away from the immediate shore district. In neither of the last two instances were cocoons examined to any extent, so that it was impossible to say whether the mortality was due to parasitism or disease. Mr. Kircher remarked that invariably cocoons (*cecropia*) attached to the branches of trees were good, while those at the base of the tree trunk were bad.

Mr. Angelman cited the note on *Erebus odora* in the February issue of the NEWS, and remarked that many more specimens were taken in western localities than in eastern ones, a fact probably due to the moths travelling northwardly from Mexico, along the range of the Rocky Mountains, and thence scattering to the lower lands. He thought it not beyond the bounds of possibility, however, that the insect should breed in the territory where it was found. Mr. Doll spoke of the abundance in which the species occurred at Brownsville, Texas, where during the day a dozen or more would gather on the walls of the hut assigned to him as a temporary habitation. Mr. Buchholz said that Mr. Kemp had a similar experience in the West Indies, where the insects would actually come to the dining table, attracted by the odor of beer. Mr. Doll said he found a single larva at Brownsville, and believes that it is a general feeder on low plants. The recorded food-plant, fig, does not occur at Brownsville.

JOHN A. GROSSBECK, *Secretary.*

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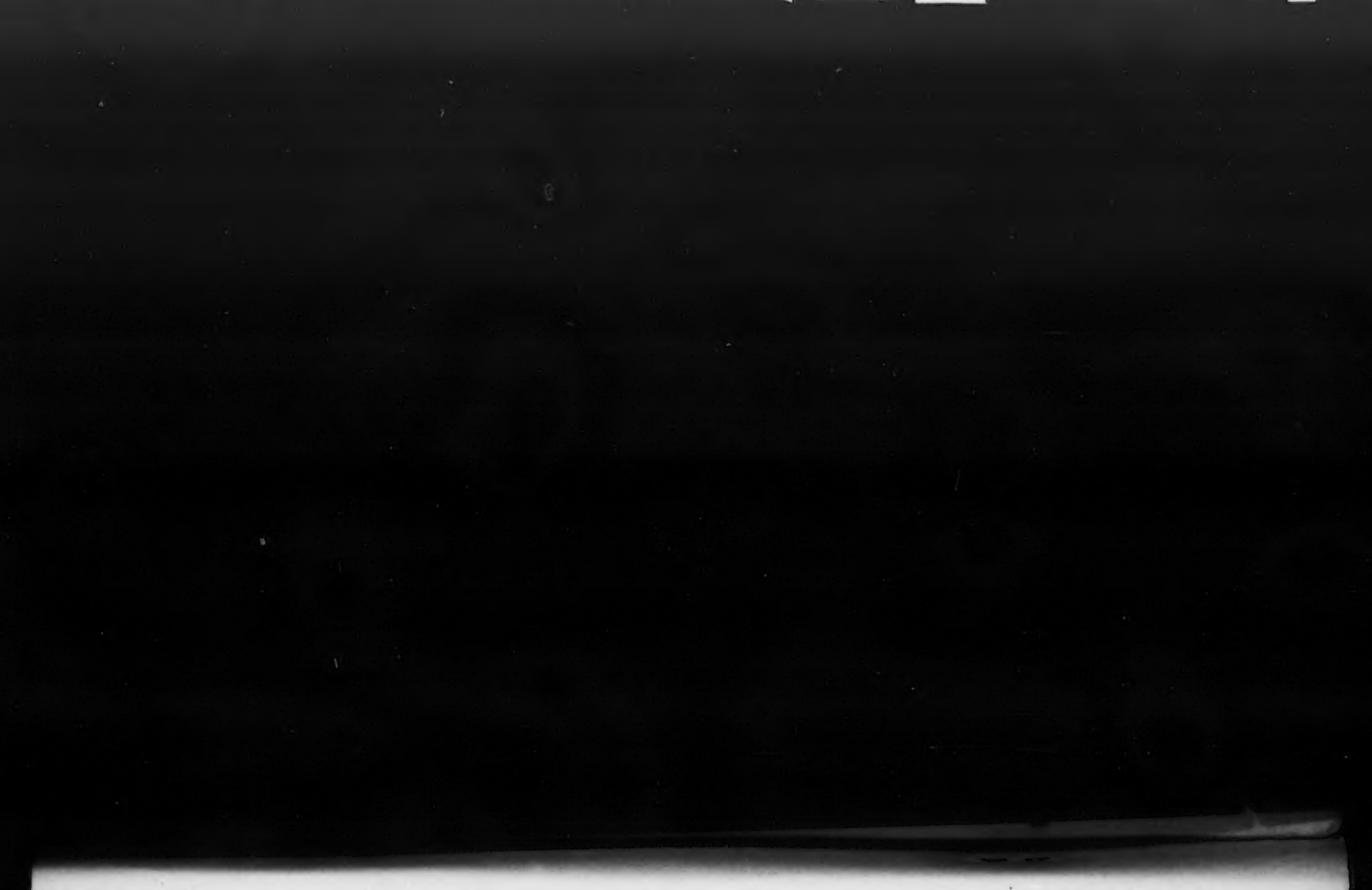

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